RESOURCE AND PATIENT MANAGEMENT SYSTEM

Laboratory
(LR)

Patch Addendum

Version 5.2 Patch 15
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Information Technology Support Center
Division of Information Resources
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PREFACE

This guide explains how to set up and use Logical Observation Identifier Names and Codes (LOINC®1) for laboratory tests. The purpose of using LOINC codes instead of laboratory test names is to standardize the tests, results, and methods across laboratory databases, regardless of how the tests might be named. The use of a standard convention for laboratory test and result identification will also allow the exchange and integration of data between facilities and organizations using a variety of information systems. The primary focus of this patch is to provide a tool for automated surveillance of diagnostic tests of interest to the Centers for Disease Control (CDC).

The patch includes a menu option for automatically assigning LOINC codes to existing laboratory tests in a facility database based upon test name, site/specimen, units, and methodology if known. Reports of tests automatically assigned LOINC codes (mapped) and those that were not assigned LOINC codes (not mapped) can be run upon completion of the automatic mapping process. The report of mapped tests can subsequently be reviewed to correct erroneous or ambiguous mapping. In addition LOINC codes may be assigned to tests skipped in the automated process using a manual mapping menu option.

Several options are also included in the patch for exporting the desired data to Indian Health Service Headquarters. All privacy and confidentiality standards are met for the export process by excluding patient identifiers of name, chart number, date of birth, and social security number. The composite data will subsequently be made available for a web-based ad hoc query system.

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1.0   Special Precaution

If your site is running any non RPMS software that interfaces directly with the RPMS Laboratory package, or you have made local modifications, or an outside vendor has made changes to the RPMS Laboratory package itself, it is imperative that you contact your software vendor **PRIOR** to the installation of this patch to insure that the package's functionality will not be disrupted as a result of the patch installation.

2.0   Introduction

2.1   Installation and Maintenance

Full directions for installation of this patch are provided in the LR*5.2*15 patch notes. There are no unique resource or device requirements. However, there are configurable site parameters for exports as defined in the patch notes. Once mapping has been completed and site parameters configured, the following maintenance is anticipated:

- o Assigning LOINC codes to any new test that may be added to the database
- o Adding new LOINC codes to the table of codes that are exported to CDC
- o Purging or removing old files that have been exported

This patch requires the expertise of the site manager for patch installation and setting export parameters. In addition, laboratory personnel with technical expertise and familiarity with the laboratory test database and test methodology will be required to oversee the assignment of LOINC codes.

This patch inserts a LOINC code field under each site/specimen defined for a CH subscript atomic laboratory test as indicated in the text box.

```
LABTEST IEN: 176                        NAME: SODIUM
  TYPE: BOTH
  SUBSCRIPT: CHEM, HEM, TOX, SER, RIA, ETC.
  LOCATION (DATA NAME): CH;5;1          UNIQUE ACCESSION #: NO
  LAB COLLECTION SAMPLE: BLOOD          TEST COST: 2
  FIELD: DD(63.04,5,                    HIGHEST URGENCY ALLOWED: STAT
  REQUIRED TEST: YES                    FORCED URGENCY: ROUTINE
COMBINE TEST DURING ORDER: YES       PRINT NAME: NA
  PRINT ORDER: 13.9                     DATA NAME: SODIUM
SITE/SPECIMEN: PLASMA                   REFERENCE LOW: 140
  REFERENCE HIGH: 148                   CRITICAL LOW: 120
  CRITICAL HIGH: 160                    UNITS: mmol/L
  CPT CODE: 84295                       PANEL (CPT): 80007
  LOINC CODE: 2951
```

Figure 2-1: Sample LOINC Code Field

LOINC fields do not exist for CH subscript panel tests, MI subscript tests, or for BB subscript tests. Users should not expect to have 100% of the CH subscript atomic tests automatically assigned a LOINC code because of discrepancies in units, site/specimens, and ambiguous test names.

A diagram of the LOINC process workflow is provided in Figure 2-2.
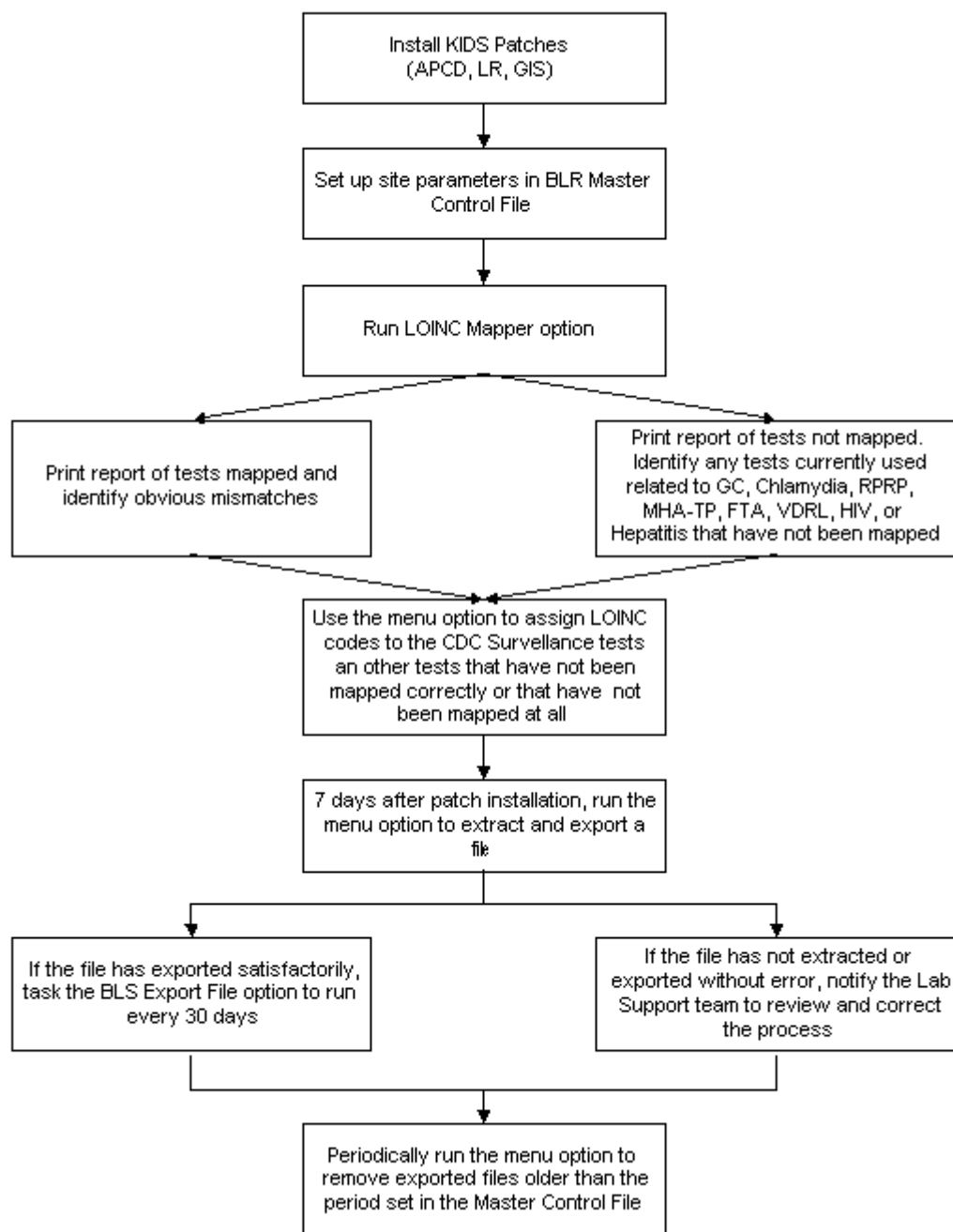
LOINC Process Workflow

Figure 2-2: LOINC Process Workflow

3.0   LOINC Codes

A LOINC code is a number followed by a check digit (e.g. 1825-9). Each LOINC code is permanent, unique, and represents a single test record. LOINC codes are assigned based on five to six pieces of information:

1. The name of the analyte or test (e.g., Sodium, Trichomonas vaginalis, Fecal Occult Blood)

   In addition, the name of the analyte may be further clarified by several different criteria:

   The class or subclass (e.g., Hepatitis A Virus Ab.IgM where IgM is the subclass, Cholesterol.HDL where HDL is the subclass)

   A challenge dose or condition (e.g., 1 HR GTT post 100 g. glucose, Triglyceride post 12 Hour Fast)

2. The property measured (e.g., Mass, Volume, Mass concentration, Number, Ratio)

3. The time aspect of the measurement; whether it is a measurement at a moment in time (PT) or an observation extended over a period of time (e.g., Random Urine Protein versus Total Protein in a 24 hour Urine specimen)

4. The type of specimen (e.g., Urine, 24 Hr Urine, Synovial Fluid, Blood)

5. The type of measurement (scale) (e.g., Quantitative numeric result, Ordinal result such as Negative or Positive, Nominal or categorical results with no natural order such as urine color)

6. Where relevant, the method used to produce the result (e.g., EIA, IB, LA)

Figure 3-1 illustrates the fields in a LOINC Record for a fingerstick glucose performed using an Accuchek Elite (LOINC code 2340-9).
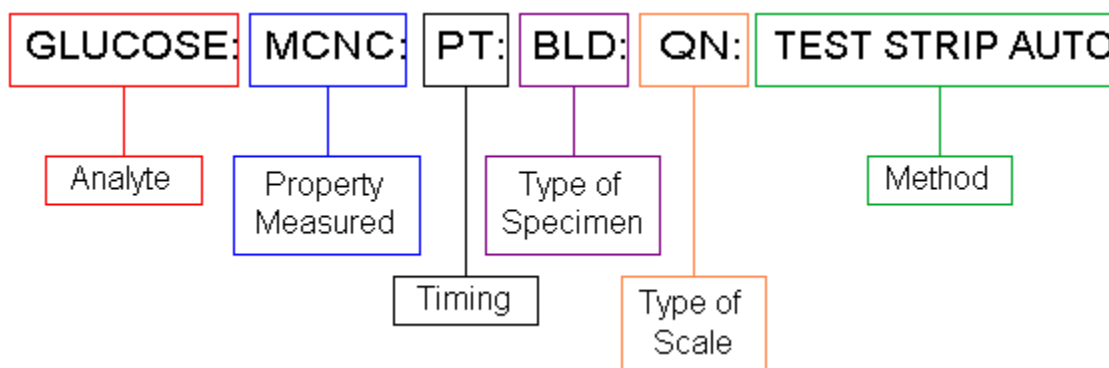

Figure 3-1: Sample fields in a LOINC record

> **Note**: The information provided in this section is taken largely from the Logical Observation Identifier Names and Codes (LOINC®) Users' Guide. For the complete text and more detail, please refer to that resource.

3.1   General Naming Conventions

In order to understand and assign LOINC codes, it is important to be familiar with certain conventions employed by the LOINC Committee.

1. **Abbreviations**: Except for the exceptions noted in the table below, abbreviations are not used in test names.

Abbreviation	Full Name
AB	Antibody
AG	Antigen
AGGL	Agglutination
CFU	colony forming unit
DNA	deoxyribonucleic acid
HIV	human immunodeficiency virus
HLA	human histocompatibility complex derived antigens
HTLV-1	human t-cell lymphotropic virus-1
Igx	immunoglobulins (e.g., IGG for immune globulin G)
RNA	ribonucleic acid
RRNA	ribosomal ribonucleic acid

Table 1: Allowable Abbreviations in Component (analyte) Names

2. The identifier of the substance being measured is always listed first. Example: Hepatitis B Virus Surface Ag, not Antigen, Hepatitis B Surface

3. The generic names of drugs are used, not the brand name, although there are often synonyms. Example: Salicylate not Aspirin

4. The full taxonomic name of an organism or virus is used, not the disease when describing a test that diagnoses that disease. Example: Respiratory Syncytial Virus Ag not RSV

5. Species and groups of species. SP identifies a single species whose identity is not known. SPP identifies the set of species beneath a genus. Example: Chlamydia sp. versus Rickettsia SPP for the Spotted fever group of Rickettsia

6. "Direct" and "Indirect" are avoided except when they are included as parts of synonym names. "Conjugated" and "Unconjugated" are not used when a more precise term, such as "glucuronidated" or "albumin-bound" is available.

7. "Platelets" is used, not "thrombocytes."

8. Vitamins are identified by the chemical name. Example: Thiamin not Vitamin B. The name containing "Vitamin" will be included as a synonym.

9. Serology tests should always be identified as to whether they measure the antigen or antibody, using the abbreviation "AB" for antibody and "AG" for antigen. "Anti" should not be included in an antibody name as it is redundant and obscures the most significant word in the name. Example: "Anti-smooth muscle AB" becomes "Smooth muscle AB."

10. VDRL can be referenced by the name Reagin AB because that is what it is.

11. The noun form of the target of the antibody is used, not the adjective, e.g., Myocardium AB, not Myocardial AB.

12. Anion vs. acid: The anionic name for chemicals used, not the acid name, Example: Lactate not Lactic acid, Urate, not Uric Acid.

13. Alcohols: the single-word names for alcohols are used. Example: Methanol, not methyl alcohol; ethanol, not ethyl alcohol.

14. OH is always spelled out as Hydroxy, or as - ol, with no space or hyphen between Hydroxy and the next word.

15. Greek letters, alpha, beta, gamma, etc., are always spelled out. Example: Alpha tocopherol, not A-tocopherol, with a space between the spelled out Greek letter and the rest of the chemical name.

16. pH is used, not log(H+).

17. When naming allergenic materials of plant or animal origin, the common name reflects the Linnaean taxonomy of "genus species," e.g., for specific species of the maple, genus Acer, the LOINC analyte names would be MAPLE RED (Acer rubrum); MAPLE SILVER (Acer saccharinum); MAPLE SUGAR (Acer saccharum). Whenever available, the Latin names are stored in the RELATED NAMES field.

18. Use of the word "total" in laboratory test names is avoided, except when denoting the denominator of a fraction. Example: ALKALINE PHOSPHATASE not ALKALINE PHOSPHATASE.TOTAL, but ALKALINE PHOSPHATASE.BONE/ALKALINE PHOSPHATASE.TOTAL.

19. A number of analyte names include punctuation characters such as commas, for example, to identify the position of multiple alkyl groups in a carbon chain. So commas appear in multiple substitutions of alkyl chains per the CAS standard, dashes appear in HLA antigen names, and parentheses (i.e. round brackets) appear in the names of red blood cell antigens.

20. All names are case insensitive. To identify parts of the few names that by international convention are case sensitive, such as red blood cell antigens,

the word 'LITTLE' is used in front of the letter that is lower case. A similar convention is used to indicate superscripts with the word SUPER. Example: Lipoprotein Little A, A LITTLE U (LITTLE A) AB Au(a) AB

21. Whenever possible, numerals are represented in their Arabic form. However, when the conventional name uses Roman numerals as is the case for clotting factors such as factor VIII, the LOINC primary name uses Roman numerals as well.

3.1.1   Classes/Subclasses

The principal name of a test may be further clarified by addition of a subclass. If a subclass is used, the name of the test is followed by a dot (period) and then the subclass. Examples of subclasses include: bound, free, bioavailable; ionized and non-ionized; glycated; glucuronidated and non-glucoronidated; IGG, IGA, IGM, IGE, IDD.

Example:
CALCIUM.IONIZED
TESTOSTERONE.FREE
HEPATITIS A VIRUS AB.IGG

The terms *peak*, *trough*, and *random* are NOT considered to be subclasses of drug measurements but are actually included in the name of the test.

Example: GENTAMICIN^TROUGH:MCNC:PT:SER/PLAS:QN

3.1.2   Challenges

Some tests are further clarified by identifying the specifics of the challenge or tolerance test – both dosage as well as the length of time post challenge. The most common use of challenge identifiers in our testing environment is for glucose tolerance tests. So for each glucose measurement, a separate LOINC code will be assigned based on the initial dose of glucose given to the patient as well as the length of time after the dose when the sample is drawn or the urine collected. Because of the lack of standardization in glucose tolerance testing in IHS facilities, the LOINC codes assigned in the automapping process are generic tolerance codes that do not specify the challenge dose of glucose.

Example:
GLUCOSE^3 HR POST XXX GLUCOSE PO:MCNC:PT:SER/PLAS:QN

A table of the actual LOINC codes is included in Appendix B so that the appropriate codes may be selected for each facility depending upon the testing protocol.

Example: The baseline (BS) serum glucose for a 100 g oral (PO) glucose dose regardless of whether it will be a 2 hr tolerance test, 3 hr tolerance test, or other would be GLUCOSE^BS PRE 100 G GLUCOSE PO:MCNC:PT:SER/PLAS:QN

Challenges may also be identifeid in terms of physiological stress; e.g. post 12 hour fast or no fluid intake for a specified period of time. Terminology used is:

Nature of Challenge
CFST—Calorie fast. No calorie intake for the time period specified.
FFST—Fluid "fast. No fluid intake for the time period specified.

Examples:
A test for glucose after 12 hours of zero caloric intake would be represented as:
    GLUCOSE^POST 12H CFST:MCNC:PT:SER/PLAS:QN

A test for osmolality after a 12-hour fluid restriction would be:
    OSMOLALITY^POST 12HR FFST:OSMOL:PT:UR:QN

3.2   Kind of Property (Kind Of Quantity)

The second part of the fully specified name of a LOINC code identifies how the analyte is actually measured and distinguishes between the same analytes measured different ways. There are four main property categories.

- **Mass**: Analytes reported with masses (milligrams, grams, kilograms, etc.)
- **Substance**: Analytes reported as moles or milliequivalents (mmol, mEq, umol).
- **Number**: Counts are associatesd with properties that begin with a number. (WBC/uL, RBC/HPF)
- **Catalytic activity**: Measures of enzymatic activity. (U/L)

Properties may be further identifed by subtypes of concentration, content, ratio, fraction, and rate.

Examples include:

- Mass concentration (MCNC): Measure of an amount divided by the containing volume. (mg/dL, g/L, ng/mL)
- Mass content (MCNT): Measure of the total mass of the analyte divided by the mass of the sample. (mg/g sample, e.g. fecal fat)
- Mass ratio (MRTO): The ratio of the mass of one substance divided by the mass of another substance in the same specimen. (mg albumin/g creatinine)
- Mass fraction (MFR): Mass expressed as a subpart of a total. (CK MB/CK Total)
- Mass rate (MRAT): The mass of a substance measured over a period of time. (g/24 hours)

A table of properties is included below for reference. Note: Entitic refers to measure per entity. Entitic quantities usually have units that include the name of some entity, e.g. per 10^6 RBCs.

Kind of Property				
Enzymatic Activity		**Other Properties**		
CACT	*Catalytic Activity	ABS	Absorbance	
CCNC	*Catalytic Concentration	ACT	*Activity	
CCRTO	Catalytic Concentration Ratio	ANAT	Anatomy	
CCNT	*Catalytic Content	ANGLE	Angle	
CFR	*Catalytic Fraction	APER	Appearance	
CRAT	*Catalytic Rate	ARB	*Arbitrary	
CRTO	*Catalytic Ratio	AREA	Area	
CACT	*Catalytic Activity	ASPECT	Aspect	
Entitic+		BIB	Bibliographic Citation	
ENT	*Entitic	CIRC	Circumference	
AENT	*Arbitrary Entitic	CLAS	*Class	
ENTSUB	*Entitic Substance of Amount	CNST	*Constant	
ENTCAT	*Entitic Catalytic Activity	COEF	*Coefficient	
ENTLEN	Entitic Length	COLOR	Color	
ENTMASS	Entitic Mass	COMPLX	Complex	
ENTNUM	*Entitic Number	CONS	*Consistency	
ENTVOL	*Entitic Volume	DEN	Density = Mass/Volume	
Mass		DEV	Device	
MASS	Mass	DIFF	*Difference	
MCNC	*Mass Concentration	ELAS	Elasticity	
MCRTO	Mass Concentration Ratio	ELPOT	Electrical Potential (Voltage)	
MCNT	Mass Content	ELPOTRAT	Voltage Rate (=Amperage)	
MFR	*Mass Fraction	ELRES	Electrical Resistance	
MINC	*Mass Increment	ENGRAT	Power = Energy/Time	
MRAT	Mass Rate	ENGRTO	Energy Ratio	
MRTO	Mass Ratio	ENRG	Energy	
RLMCNC	*Relative Mass Concentration	EQL	*Equilibrium	
THRMCNC	*Threshold Mass Concentration	EQU	Equation	
Counts		FCN	Function	
NUM	*Number	FIND	Finding	
NARIC	Number Areic (number per area)	FLDCONDUCT	Fluid Conductance	
NCNC	*Number Concentration (count/vol)	FLDRESIST	Fluid Resistance	
NCNT	Number Content = Count/Mass	FORCE	Mechanical Force	
NFR	*Number Fraction	FREQ	Frequency	
NRAT	Number Rate = Count/Time	IMP	Impression/interpretation of study	
NRTO	Number Ratio	ID	Identifier	
Substance Amount		HX	History	
RLSCNC	*Relative Substance Concentration	KINV	*Kinematic Viscosity	
SUB	*Substance Amount	LEN	Length	
SCNC	*Substance Concentration	LENRTO	Length Ratio	
SCRTO	*Substance Concentration Ratio	LINC	Length Increment	
SCNT	*Substance Content	LIQ	*Liquifaction	
SCNTR	*Substance Content Rate	METHOD	Method	
SFR	*Substance Fraction	MGFLUX	Magnetic flux	
SCNCIN	*Substance Concentration Increment	MORPH	Morphology	
SRAT	*Substance Rate	MOTIL	Motility	
SRTO	*Substance Ratio	OD	Optical density	
THRSCNC	Threshold Substance Concentration	OSMOL	*Osmolality	
Volumes		PCT	Percent	
VOL	*Volume	PRCTL	Percentile	
VCNT	*Volume Content	PRID	Presence or Identity	
VFR	*Volume Fraction	PPRES	*Pressure (partial)	
VRAT	*Volume Rate	PRES	Pressure	

Kind of Property			
Enzymatic Activity		**Other Properties**	
VRTO	*Volume Ratio	PRESRTO	Pressure Ratio
ARENRG	Energy/Area	RANGE	Ranges
ARRESIS	Resistance/Area	RATIO	Ratios
ARVOL	Volume/Area	RDEN	Relative Density
ARVOLRT	Volume Rate/Ratio	REL	*Relative
ARVRAT	Volume Rate/Area	ROUTE	Route of RX
Arbitrary Unit Measures	SATFR	*Saturation Fraction	
ACNC	Arbitrary Concentration	SHAPE	Shape
ACNT	Arbitrary Content	SMELL	Smell
AFR	Arbitrary Fraction	SUSC	Susceptibility
THRACNC	Threshold Arbitrary Concentration	TASTE	Taste
ARAT	Arbitrary Rate	TEMP	*Temperature
RLACNC	Relative Arbitray Concentration		
Time	TEMPDF	*Temperature Difference	
DATE	Date	TEMPIN	*Temperature Increment
TIME	Time (e.g. seconds)	TEXT	Text
TMSTP	Time Stamp -- Date and Time	THRESHOLD	*Threshold
TRTO	Time Ratio	TITR	Dilution Factor (Titer)
RCRLTM	*Reciprocal Relative Time	TYPE	Type
RLTM	*Relative Time	VEL	*Velocity
		VELRAT	*Velocity Rate
		VELRTO	*Velocity Ratio
		VISC	Viscosity

3.3   Time Aspect

A property may either be measured at a point in time or over an interval of time. When properties are measured over a period of time, the substance is usually reported as single value or "average" property over the time interval. Intervals may also be used for rate measurements such as excretion (substance rate - SRAT or mass rate - MRAT) or clearances (volume rate - VRAT). Interval measurements often apply to urine and stool where the collection time is 24 hours and the calculation is of a concentration, total amount, or clearance.

For urine collections, 24H is the "standard" measure and these are almost always reported as mass rates (MRAT), amount of substance rates (SRAT), or catalytic (CRAT) rates. These would contrast with spot or random urine tests that are represented as point (PT) measures and usually reported as concentrations - MCNC, CCNC, or SCNC for mass, catalytic, and substance concentrations respectively. However, the average concentration on a 24-hour specimen can also be reported– the time aspect value would still be 24H but the property would be MCNC/SCNC/CCNC instead of MRAT/SRAT/CRAT.

Time Categories	
PT	Measurements made at a point in time. "Spot" or "random" for urine measurements
STDY	Duration of the study

Time Categories	
ENCTR	Duration of an encounter
PROCEDURE	Duration of the procedure
XXX	Not specified; time reported in another part of the HL7 message
*	Life of the "unit". Used for blood products
H	Hour(s)
M	Minute(s)
D	Day(s)

3.4   System (Sample)Type

Sample type is the fourth part of the fully specified LOINC code. Different LOINC codes are usually assigned to the same analyte based on the sample type used. Chemical tests usually distinguish between serum, blood, urine, and CSF.

For many types of tests, the distinction between plasma and serum is irrelevant. When testing on serum or plasma is clinically equivalent, the system should be recorded as SER/PLAS. Sometimes the test can only be run on plasma or only on serum; the component will then be associated with the appropriate sample type. If the test can be run on either but the results are different and standardized (a very rare circumstance), two separate tests will be defined, one with a system PLAS and one with a system SER. The current LOINC database includes some SER tests and some PLAS tests that should really be SER/PLAS. As the database is updated, those tests originally designated as SER or PLAS will ultimately be updated an new codes assigned as SER/PLAS.

Version 5.2 of the RPMS Laboratoy Package was released with a generic "blood" site/specimen for almost all chemistry, hematology, and serology tests regardless of whether the sample actually used for testing was serum or plasma. The rationale for this database decision was to simplify and condense the display of laboraotyr tests with disparate site/specimens on the same cumulative report pages. It does, however, pose a problem in the assignment of LOINC codes, especially in the case where distinct codes exist for analytes based on SER, PLAS, or BLD as the specimen source.   The Master LOINC file distributed with this patch, assumes that a site/specimen of blood for a test normally performed on serum, will indeed be performed on serum or plasma, and therefore assigns the LOINC code for a SER/PLAS sample; e.g. Glucose; Site/Specimen – Blood; Units – mg/dL will be assigned the LOINC code of GLUCOSE:SER/PLAS:PT:MCNC. If indeed, the test is performed on a whole blood specimen, then the test will mapped incorrectly and will have to be remapped to GLUCOSE:BLD:PT:MCNC.

For many chemistry tests, separate LOINC codes are provided for analysis of materials in different types of body fluids; e.g. CSF, PRT (Peritoneal Fluid), PLR (Pleural Fluid, PCAR (Pericardial Fluid). In addition a sample name of FLU is

provided as a way to recognize a variety of blody fluids not specifically identified. The code XXX is also used to identify a sample that is not specified.

If the test is run on a combination of types of samples (such as a ratio of substance found in CSF and plasma) the codes are joined with a "+" : CSF+PLAS, CSF+SER, ISLT+SER, etc.

A table of Laboratory System/Sample Type Codes is provided below.

Laboratory System/Sample Types					
Abbr.	Name	Abbr.	Name	Abbr.	Name
ABS	Abscess	FLT	Filter	SMN	Seminal Fluid
AMN	Amniotic fluid	FIST	Fistula	SMPLS	Seminal Plasma
ANAL	Anus	FLU	Body fluid, unsp	SER	Serum
ASP	Aspirate	FOOD	Food sample	SKN	Skin
BPH	Basophils	GAS	Gas	SKM	Skeletal muscle
BIFL	Bile fluid	GAST	Gastric fluid/contents	SPRM	Spermatozoa
BLDA	Blood arterial	GEN	Genital	SPT	Sputum
BBL	Blood bag	GENC	Genital cervix	SPTC	Sputum – coughed
BLDC	Blood capillary	GENF	Genital fluid	SPTT	Sputum - tracheal aspirate
BLDCO	Blood – cord	GENL	Genital lochia	STON	Stone (use CALC)
BLDMV	Blood- Mixed Venous	GENM	Genital Mucus	STL	Stool = Fecal
BLDP	Blood – peripheral	GENV	Genital vaginal	SWT	Sweat
BPU	Blood product unit	HAR	Hair	SNV	Synovial fluid (Joint fluid)
BLDV	Blood venous	IHG	Inhaled Gas	TEAR	Tears
BON	Bone	IT	Intubation tube	THRT	Throat
BRAIN	Brain	ISLT	Isolate	THRB	Thrombocyte (platelet)
BRTH	Breath (use EXG)	LAM	Lamella	TISS	Tissue, unspecified
BRO	Bronchial	WBC	Leukocytes	TISG	Tissue gall bladder
BRN	Burn	LN	Line	TLGI	Tissue large intestine
CALC	Calculus (=Stone)	LNA	Line arterial	TLNG	Tissue lung
CDM	Cardiac muscle	LNV	Line venous	TISPL	Tissue placenta
CNL	Cannula	LIQ	Liquid NOS	TSMI	Tissue small intestine
CTP	Catheter tip	LIVER	Liver	TISU	Tissue ulcer
CSF	Cerebral spinal fluid	LYM	Lymphocytes	TRAC	Trachea
CVM	Cervical mucus	MAC	Macrophages	TUB	Tube, unspecified
CVX	Cervix	MAR	Marrow (bone)	ULC	Ulcer
COL	Colostrum	MEC	Meconium	UMB	Umbilical blood
CNJT	Conjunctiva	MBLD	Menstrual blood	UMED	Unknown medicine
CUR	Curettage	MLK	Milk	URTH	Urethra
CRN	Cornea	MILK	Breast milk	UR	Urine
CYST	Cyst	NAIL	Nail	URC	Urine clean catch
DENTIN	Dentin	NOS	Nose (nasal passage)	URT	Urine catheter
DIAFP	Peritoneal Dialysis fluid	ORH	Other	URNS	Urine sediment
DIAF	Dialysis fluid	PAFL	Pancreatic fluid	USUB	Unknown substance
DOSE	Dose med or substance	PAT	Patient	VITF	Vitreous Fluid
DRN	Drain	PEN	Penis	VOM	Vomitus
DUFL	Duodenal fluid	PCAR	Pericardial Fluid	BLD	Whole blood
EAR	Ear	PRT	Peritoneal fluid /ascites	BDY	Whole body
EARW	Ear wax (cerumen)	PLC	Placenta	WAT	Water
ELT	Electrode	PLAS	Plasma	WICK	Wick
ENDC	Endocardium	PLB	Plasma bag	WND	Wound
ENDM	Endometrium	PLR	Pleural fluid (thoracentesis fld)	WNDA	Wound abscess
EOS	Eosinophils	PMN	Polymorphonuclear neutrophils	WNDE	Wound exudate
RBC	Erythrocytes	PPP	Platelet poor plasma	WNDD	Wound drainage
EYE	Eye	PRP	Platelet rich plasma	XXX	To be specified in another part of the message
EXG	Exhaled gas (=breath)	PUS	Pus		
FIB	Fibroblasts	SAL	Saliva		

3.5   Type of Scale

The fifth required part of a LOINC name is the scale of the measure; in simple terms, units. There are five different scales used in LOINC coding as described in the following table.

Type of Scale		
Type of Scale	**Abbr.**	**Description**
Quantitative	QN	The result of the test is a numeric value that relates to a continuous numeric scale. Reported either as an integer, a ratio, a real number, or a range. The test result value may optionally contain a relational operator from the set {<=, <, >, >=}. Valid values for a quantitative test are of the form "7", "-7", "7.4", "-7.4", "7.8912", "0.125", "<10", "<10.15", ">12000", 1-10, 1:256
Ordinal	ORD	Ordered categorical responses with no linear relationship to each other, e.g. 1+, 2+, 3+ ; positive, negative; reactive, indeterminate, nonreactive, yes, no.
Quantitative or Ordinal	ORDQN	Test can be reported as either ORD or QN, e.g., an antimicrobial susceptibility that can be reported as either resistant, intermediate, susceptible or as the mm diameter of the inhibition zone. (Previously named SQN) We discourage the use of ORDQN.
Nominal	NOM	Nominal or categorical responses that do not have a natural ordering. e.g. names of bacteria (reported as answers); categories of appearance that do not have a natural ordering, e.g., yellow, clear, bloody.
Narrative	NAR	Text narrative, such as the description of a microscopic part of a surgical papule test.

3.6   Type of Method

The method by which a test was performed may or not be included as the sixth part of a fully specified LOINC name. Methods are usually used when they provide a distinction between tests that measure the same analyte but which have different clinical significance or a different clinical reference range. Methods are rarely specified for chemistry or hematology tests but are often specified for Coagulation and Serology tests. For example, serology tests may be performed in multiple manners with significant differences in specificity and sensitivity. The choice of LOINC code will be determined by whether the test was performed by enzyme immunoassay (EIA), Western Blot (WB), immunodiffusion (ID), Complement Fixation (CF), Latex Agglutination (LA), Immunoflourescence(IF), or Hemagglutination Inhibition (HA).

Since many of the tests in the IHS database are those performed by reference laboratories, the name of the test does not always indicate what methodology has been used to perform them. Therefore the LOINC master distributed in this patch includes the most generic codes for these tests; those that do not specify any methodology. If the methodology is known, then the codes automatically assigned during the automapping process, may be replaced by the more appropriate specific

codes. Because of the generic naming conventions used in many databases, you will find that no LOINC codes will be assigned during the automapping process. These tests will have to be correctly named and manually mapped.

Method Abbreviations		
Method	**Abbr.**	**Comment**
AGGLUTINATION	AGGL	
AGGLUTINATION -- RED BLOOD CELL	AGGL RBC	Blood bank typing
COAGULATION ASSAY	COAG	To distinguish coagulation assays based on coagulation
COMPLEMENT FIXATION	CF	
COMPUTERIZED TOMOGRAPHY	CT	
CYTOLOGY STAIN	CYTOSTAIN	The staining method used for pap smears, fine needle aspirates and other cell stains.
DNA NUCLEIC ACID PROBE	PROBE	
PROBE WITHOUT AMPLIFICATION	PROBE	
PROBE WITH TARGET AMPLIFICATION	PROBE.AMP. TAR	
PROBE WITH SIGNAL AMPLIFICATION	PROBE.AMP.S IG	
ENZYMATIC ASSAY	ENZY	To distinguish coagulation assays based on enzymatic activity.
ENZYME IMMUNOASSAY	EIA	Includes all variants of enzymatic assays including ELISA, CEIA, etc
FLOCCULATION ASSAY	FLOC	
HEMAGGLUTINATION INHIBITION	HAI	
IMMUNE BLOT	IB	
IMMUNE DIFFUSION	ID	
IMMUNE FLUORESCENCE	IF	Encompasses entire range of immunofluorescent tests DFA, FA, etc
IMMUNE STAIN	IMMUNE STAIN	Cells "stained" with immune enzyme. Also called "Cyto immune enzyme" stain.
LATEX AGGLUTINATION	LA	
LEUKOCYTE HISTAMINE RELEASE	LHR	
MINIMUM INHIBITORY CONCENTRATION	MIC	Antibiotic susceptibilities
MINIMUM LETHAL CONCENTRATION	MLC	Also called MB (bactericidal) C
MOLECULAR GENETICS	MOLGEN	General class of methods used to detect genetic attributes on a molecular basis including RFL, PCR and other methods.
NEUTRALIZATION	NEUT	
RADIOIMMUNOASSAY	RIA	
SERUM BACTERICIDAL TITER	SBT	Antibacterial susceptibilities
ULTRASOUND	US	
VISUAL COUNT	VC	

The database recognizes three methodologies for coagulation tests: coagulation which measures the coagulation activity; immune, which measures the coagulation constituent; and enzymatic, which measures the coagulation factor via enzyme rate methods. Again because of the lack of specificity in most databases, either generic LOINC codes or no LOINC codes will be assigned during the automapping process.

The type of methodology is also difficult to identify by test name in many databases for DNA and RNA probe tests. The user may need to review the methodology employed by their reference laboratory and reassign a LOINC code to those tests mapped by the automapper. The following table indicates which methodologies fall into the different categories of PROBE.AMP.TAR versus PROBE.AMP.SIG.

PROBE.AMP.TAR		
PCR	Polymerase Chain Reaction	Applies to: DNA, RNA Roche Molecular Systems (thermal cycler) Requires repeated cycles of heating and cooling - each cycle doubles the target
TMA	Transcription Mediated Amplification	Applies to DNA, RNA Gen-Probe, Inc. (isothermal)
NASBA	Nucleic Acid Sequence Based Analysis	Applies to RNA, DNA Organon-Tenika Corp (isothermal)
SDA	Strand Displacement Amplification	Applies to DNA Beckon Dickenson (isothermal)
LAT	Ligation-Activated Transcription	
3SR SR	3 Self-Sustaining Sequence Replication	Applies to RNA, DNA Bartel's Diagnostic (isothermal)
LCR	Ligase Chain Reaction	Also probe amplification category method Abbott Laboratories (thermal cycler)
QBR	Q-Beta Replicase or probe amplification category method	Applies to DNA RNA Gene Track Systems. (isothermal)
PROBE.AMP.SIG		
HPA	Hybridization Protection Assay	Applies to RNA Gen-Probe Accuprobe
BdnA	Branched Chain DNA	Applies to DNA, RNA Chiron Corp (isothermal)

3.7   Special Cases

3.7.1   Cell Counts

Quantitative counts of various entities and cells in blood, urine, CSF, and other body fluids may be performed and reported in one of three ways. Cell counts in blood are often reported as absolute counts per unit volume (NCNC), or percent of a general cell type, e.g., percent eosinophils, (NFR). Methodology is usually reported as either a manual or automated count method. Counts on urine and other body fluids can also be done as direct counts and reported as NCNC or NFR. However, they are more

often reported as the number of entities or cells per microscopic high power or low power field, e.g., 5-10 cells per high power field. These are really numbers per area (NARIC).

Example: The number of erythrocyte casts per low power field would be reported as:

ERYTHROCYTE CASTS:NARIC:PT:URNS:QN:MICROSCOPY.LIGHT.LPF

Even though the values are reported as a range, the scale is still QN, because the values can be related through a ratio. HPF or LPF are used to identify high power and low power fields respectively. Large entities (such as casts) are usually reported per low power fields, smaller entities per high power fields.

One other way such entities are reported is as a pure ordinal, e.g., none, few, moderate, loaded. These would be specified as ACNC properties with ordinal scale, e.g., ERYTHROCYTES:ACNC:PT:SMN:ORD:MICROSCOPY.LIGHT.

It is highly recommended that the LOINC codes assigned during the automapping process be reviewed to be sure that manual and auto methods are appropriately identified.

3.7.2   Toxicology — Drug Testing

The assignment of LOINC codes for drugs of abuse testing, screening and confirmation is fairly complex and often hard to equate to clinical practice in IHS laboratories. When the master file was developed, any drug (metamphetamine) or drug class (amphetamines) which had no units associated with the site/specimen was assigned a LOINC code of ORD:SCREEN. Example: AMPHETAMINE:ACNC:PT:UR:ORD:SCREEN.

Any drug or drug class with a site/specimen with associated units was assigned a LOINC code of ACNC:QN. Example: AMPHETAMINE:ACNC:PT:UR:QN.

If details of drug testing and confirmation are known, the user is encouraged to select the replace the LOINC codes assigned during the automapping process with more specific codes.

3.7.3   Blood Bank

Because of the Laboratory Test file (#60) structure, LOINC codes have not been assigned to BB subscript tests. However, LOINC codes have been assigned to ABO and RH Typing and RBC Antibody Screening if these tests have been developed as CH subscript tests.

3.7.4   Microbiology

Because of the Laboratory Test file (#60) structure, LOINC codes have not been assigned to MI subscript tests. LOINC codes may be assigned by the user if these tests have been developed as CH subscript tests. They are not distributed in this patch.

3.7.5   Panel Tests

Because of the Laboratory Test file (#60) structure, LOINC codes have not been assigned to CH subscript panel tests.

4.0   The LOINC Menu

During installation of this patch, the LOINC Main Menu will automatically be added to the Lab Liaison Menu. It is not locked with any security key beyond the LRLIAISON key usually held by the laboratory manager, laboratory supervisors, and/or application coordinator. If a custom menu is used at a facility, the site manager will be required to add the [LRLOINC] menu option to the local laboratory menu at a supervisory level.

The menu contains all the menu options from the original LOINC patch distributed by the VA as well as new options developed specifically for Indian Health Service. Because of VA functionality not used in the Indian Health Service, many of the original VA options are not used and others have been modified for IHS use. The menu options in bold text below will be reviewed in the order they will be used.

```
  IHSL   IHS Loinc Menu ...
     CLN     Cleanup LOINC Export Log/Files
     EXP     Export HL7 Data to CDC
     MLC     Automatically Map LOINC Codes to Tests in File 60
     MLT     Manually Map a LOINC Code to a Laboratory Test
     RSN     Resend CDC Export File
     ULE     Update Table of LOINC Codes to Export to CDC
  1      Specimen HL7 Codes Print
  2      Topography Print With/Without LEDI HL7 Codes
  3      Add/Edit Topography Specimen HL7 Code
  4      National Laboratory File ...
  5      Lookup LOINC Code
  6      Map Lab Tests to LOINC Codes
            **> Out of order:  Not used in IHS
  7      NLT/LOINC Codes Print
  8      Print Lab Tests Mapped/Not Mapped to LOINC Codes
  9      Lab Tests With/Without Result NLT Codes Print
```
Figure 4-1: The LOINC Menu

4.1   Automatically Map LOINC Codes to Tests in File 60 (MLC)

After the patch is installed, an individual familiar with the laboratory database will execute the option MLC option (Map LOINC Codes to Tests in File 60). This option runs the BLSMAP routine. When the menu option is selected, the dialogue in the box on the next page is displayed to the user.

> **Note: T**he automapper is run only once after the initial installation of the patch. All subsequent mapping will be completed using the manual mapping option.

```
                CROW HOSPITAL

 AUTO-MAP LOINC CODES INTO THE LABORATORY TEST FILE

     This option is used to automatically map LOINC Codes from
```

```
      the IHS Master LOINC table to your Laboratory test file
     (file 60).

The test must match the master by Test name, Site/Specimen and Units.  If a
match is found in the master file, that loinc code is added to your test in
the Laboratory test file.



Would you like a list of all Tests that were assigned a LOINC Code? Y// <ENT>



Do you want to continue? N//  Y
DEVICE: HOME//     Right Margin: 80// <ENT>
.... mapping codes...
Mapping loinc code 1649 - CALCITRIOL:MCNC:PT:SER:QN to lab test 1,25
DIHYDROXY VIT D
Mapping loinc code 1649 - CALCITRIOL:MCNC:PT:SER:QN to lab test 1,25
DIHYDROXY VIT D
Mapping loinc code 21036 - 17-HYDROXYCORTICOSTEROIDS:MRAT:24H:UR:QN to lab
test
17-HYDROXYCORTICOSTEROIDS
Mapping loinc code 21036 - 17-HYDROXYCORTICOSTEROIDS:MRAT:24H:UR:QN to lab
test
17-HYDROXYCORTICOSTEROIDS
Mapping loinc code 1669 - 17-HYDROXYPROGESTERONE:MCNC:PT:SER:QN to lab test
17-H
YDROXYPROGESTERONE
Mapping loinc code 6766 - 17-KETOSTEROIDS:MRAT:24H:UR:QN to lab test 17-
KETOSTEROIDS,TOTAL
Mapping loinc code 12646 - GLUCOSE~1H POST XXX CHALLENGE:MCNC:PT:SER/PLAS:QN
to lab test 1HR GLU
Mapping loinc code 1504 - GLUCOSE~1H POST 50 G GLUCO
SE PO:MCNC:PT:SER/PLAS:QN to lab test 1HR GTT PRENATAL SCREEN
Mapping loinc code 2694 - OSMOLALITY:OSMOL:24H:UR:QN to lab test 24HR URINE
OSMOLALITY
```

Figure 4-2: Running the MCD option

If the user answers yes, then the auto-mapping takes place as follows:

```
Do you want to continue? N// Y  YES
DEVICE: HOME// <PRINTER NUMBER>  Right Margin: 80// <ENT>
.... mapping codes...
Mapping loinc code 1649 - CALCITRIOL:MCNC:PT:SER:QN to lab test 1,25
DIHYDROXY VIT D
Mapping loinc code 1649 - CALCITRIOL:MCNC:PT:SER:QN to lab test 1,25
DIHYDROXY VIT D
Mapping loinc code 21036 - 17-HYDROXYCORTICOSTEROIDS:MRAT:24H:UR:QN to lab
test
17-HYDROXYCORTICOSTEROIDS
Mapping loinc code 21036 - 17-HYDROXYCORTICOSTEROIDS:MRAT:24H:UR:QN to lab
test
17-HYDROXYCORTICOSTEROIDS
Mapping loinc code 1669 - 17-HYDROXYPROGESTERONE:MCNC:PT:SER:QN to lab test
17-HYDROXYPROGESTERONE
Mapping loinc code 6766 - 17-KETOSTEROIDS:MRAT:24H:UR:QN to lab test 17-
```

```
KETOSTEROIDS,TOTAL
Mapping loinc code 12646 - GLUCOSE~1H POST XXX CHALLENGE:MCNC:PT:SER/PLAS:QN
to lab test 1HR GLU
Mapping loinc code 1504 - GLUCOSE~1H
POST 50 G GLUCOSE PO:MCNC:PT:SER/PLAS:QN to lab test 1HR GTT PRENATAL SCREEN
Mapping loinc code 2694 - OSMOLALITY:OSMOL:24H:UR:QN to lab test 24HR URINE
OSMOLALITY
```

Figure 4-3: Sample Mapping

The mapper runs until all mappable tests have been assigned a LOINC code.

Upon completion of the automapping, the printed report should be reviewed to determine if there are any obvious mismaps or perhaps tests that can be mapped with more accuracy, (e.g., Mapping loinc code 12646 - GLUCOSE~1H POST XXX CHALLENGE:MCNC:PT:SER/PLAS:QN to lab test 1HR GLU).

Generic LOINC codes were used in the Master file for Glucose tolerance tests. If it is known that this is a specimen collected 1 hour after a 100 g glucose challenge, a more specific code may be assigned using the manual mapping process.

4.2   Print Lab Tests Mapped/Not Mapped to LOINC Codes

The next step in the process is to print the list of tests which have and which have not been assigned LOINC codes. The reports may be run from the same menu option as follows:

```
This option prints a list of the LABORATORY TESTS from the LABORATORY TEST
FILE.
        You will be prompted to print lab tests that are
                mapped/not mapped to a LOINC code.
        Inactive(Type:Neither) lab tests are not reported.


Print lab tests that are mapped/not mapped to a LOINC code.

    Select one of the following:


        1          MAPPED
        2          NOT MAPPED

Enter response:  2  NOT MAPPED
DEVICE: HOME//  <PRINTER NAME OR NUMBER>
```

Figure 4-4: Printing lab tests mapped/ not mapped to LOINC codes

The report will print as follows and can be used to identify tests and site/specimens that can be manually mapped.

```
            LAB TESTS NOT MAPPED TO LOINC CODES
    May 07, 2002@20:35                                    Page   1


    LAB TEST                        SPECIMEN
======================================================================
```

```
 FIBRINOGEN                              PLASMA
 ZZBLEEDING TIME                         BLOOD
                                         PLASMA
 MESOTHELIAL                             BLOOD
                                         SYNOVIAL FLUID
 CRYSTALS
SYNOVIAL FLUID
 SAT                                     PLASMA
                                         ARTERIAL BLOOD
 PH                                      UNKNOWN
 PH, STOOL                               ARTERIAL BLOOD
 FEBRILE AGGLUTINS                       SERUM
 FTA                                     CEREBROSPINAL FLUID
 RPR-AIH                                 SERUM
```

Figure 4-5: Sample report of lab tests not mapped to LOINC codes

The report of mapped tests may also be run by using the same menu option and selecting 1 Mapped tests

4.3   Manually Map a LOINC Code to a Laboratory Test (MLT)

Any tests which are not assigned LOINC codes during the matching phase will have LOINC codes assigned manually, if possible. This will be the responsibility of each site. Use the MLT option (Manually Map a LOINC Code to a Laboratory Test) to do this individual test mapping.

When you choose the MLT menu option, you are first prompted to enter the name of the test to be mapped. The entire Laboratory Test definition is displayed followed by a numbered listing of the site/specimens, units, and previously assigned LOINC codes. Continue the mapping by selecting the number of the site/specimen to which a LOINC code will be assigned. You will then be prompted to enter the LOINC Code/Name of the test that is to be mapped.

```
Enter Lab Test to Link/Map to LOINC : SODIUM

You have selected the following test:
LABTEST IEN: 176                        NAME: SODIUM
  TYPE: BOTH
  SUBSCRIPT: CHEM, HEM, TOX, SER, RIA, ETC.
  LOCATION (DATA NAME): CH;5;1          UNIQUE ACCESSION #: NO
  LAB COLLECTION SAMPLE: BLOOD          TEST COST: 2
  FIELD: DD(63.04,5,                    HIGHEST URGENCY ALLOWED: STAT
  REQUIRED TEST: YES                    FORCED URGENCY: ROUTINE
  COMBINE TEST DURING ORDER: YES        PRINT NAME: NA
  PRINT ORDER: 13.9                     DATA NAME: SODIUM
SITE/SPECIMEN: BLOOD                    UNITS: mmol/L
SITE/SPECIMEN: URINE                    UNITS: mmol/L
SITE/SPECIMEN: SERUM                    LOINC CODE: 2951
SITE/SPECIMEN: PLASMA                   REFERENCE LOW: 140
  REFERENCE HIGH: 148                   CRITICAL LOW: 120
  CRITICAL HIGH: 160                    UNITS: mmol/L
  CPT CODE: 84295                       PANEL (CPT): 80007
```

```
   LOINC CODE: 2951
SITE/SPECIMEN: FECES                         UNITS: mEq/L
COLLECTION SAMPLE: BLOOD
SYNONYM: NA
SYNONYM: SODIUM, RANDOM URINE
SYNONYM: URINE NA, RANDOM
SYNONYM: URINE SODIUM, (Spot)
SYNONYM: SODIUM,STOOL
SYNONYM: SODIUM(Tricore)
INSTITUTION: CROW HOSPITAL                ACCESSION AREA: CHEMISTRY
INSTITUTION: LODGE GRASS HEALTH CENTER  ACCESSION AREA: LG-CHEM
INSTITUTION: PRYOR HEALTH STATION         ACCESSION AREA: PR-CHEM


Select from the available site/specimens:

     SITE/SPECIMEN                  UNITS          LOINC CODE
     -------------                  -----          ----------
1)   BLOOD                          mmol/L
2)   URINE                          mmol/L
3)   SERUM                                         2951
4)   PLASMA                         mmol/L         2951
5)   FECES                          mEq/L
Select the Site/Specimen Entry for this test:  (1-5): 1



Enter LOINC Code/Name : SODIUM..SER/PLAS  2951
   SODIUM:SCNC:PT:SER/PLAS:QN


Note that if the abbreviation of the site/specimen is entered after '..', the
search will be narrowed for an appropriate LOINC code.

LOINC CODE: 2951    SODIUM:SCNC:PT:SER/PLAS:QN
SYSTEM: SER/PLAS                         CLASS: CHEM
COMPONENT: SODIUM
PROPERTY: Substance Concentration
TIME ASPECT: POINT
SCALE TYPE: Quantitative



Is this the correct one? YES


LOINC Code 2951 will be mapped to test SODIUM

Are you sure you want to Map this code to this test? YES

Loinc Code has been successfully mapped.
```

Figure 4-6: Manually mapping a LOINC code to a laboratory test

Repeat this process for each test and site/specimen that was not assigned a LOINC code during the auto-mapping process.

4.4   Update Table of LOINC Codes to Export to CDC (ULE)

Most of the LOINC codes of interest to the Centers for Disease Control have been identified and listed in a master table. If you add new LOINC codes to your database related to STD testing, Hepatitis testing, HIV testing, or Syphilis testing, you will need to verify that these LOINC codes are included in the master table.

Begin by choosing the ULE menu option (Update Table of LOINC Codes to CDC). A screen of current LOINC codes will display, in numeric order. Use the up and down arrows to scroll up or down the list one line at a time or type a plus sign (+) and press the Enter key to scroll down one screen at a time.

```
BLS LOINC TO EXPORT        May 30, 2002 11:23:47        Page:  1 of  19
List of Lab Tests (by LOINC Code) that are currently being exported to CDC.

    42)  5191   HEPATITIS B VIRUS LITTLE E AG:ACNC:PT:SER:QN:EIA
    43)  5192   HEPATITIS B VIRUS LITTLE E AG:ACNC:PT:SER:ORD:RIA
    44)  5193   HEPATITIS B VIRUS SURFACE AB:ACNC:PT:SER:QN:EIA
    45)  5194   HEPATITIS B VIRUS SURFACE AB:ACNC:PT:SER:QN:RIA
    46)  5195   HEPATITIS B VIRUS SURFACE AG:ACNC:PT:SER:ORD
    47)  5196   HEPATITIS B VIRUS SURFACE AG:ACNC:PT:SER:ORD:EIA
    48)  5197   HEPATITIS B VIRUS SURFACE AG:ACNC:PT:SER:ORD:RIA
    49)  5198   HEPATITIS C VIRUS AB:ACNC:PT:SER:QN:EIA
    50)  5199   HEPATITIS C VIRUS AB:ACNC:PT:SER:ORD:IB
    51)  5200   HEPATITIS D VIRUS AB:ACNC:PT:SER:QN:EIA
    52)  5201   HEPATITIS D VIRUS AB:ACNC:PT:SER:QN:RIA
    53)  5220   HIV 1 AB:ACNC:PT:SER:QN:EIA
    54)  5221   HIV 1 AB:ACNC:PT:SER:ORD:IB
    55)  5223   HIV 1+2 AB:ACNC:PT:SER:QN:EIA
    56)  5225   HIV 2 AB:ACNC:PT:SER:ORD:IB


Select Action:Q// AL  Add LOINC

+         Enter ?? for more actions
AL Add LOINC               +  Next Screen          Q  Quit
RL Remove LOINC from List - Previous Screen
```

Figure 4-7: Update the table of LOINC codes to export to CDC

Scroll through the list to determine whether the LOINC codes you have added to your laboratory test file appear in the list. If they do not, then they must be added to the list by choosing the AL action (Add LOINC).

```
Adding new Lab Test (LOINC code) to the exported lab test list....

Select BLS EXPORT LOINC LIST LOINC TO EXPORT: 6562
   TREPONEMA PALLIDUM AB.IGM:ACNC:PT:SER:ORD
  Are you adding '6562' as a new BLS EXPORT LOINC LIST (the 254TH)? No// Y
(Yes)
```

Figure 4-8: Adding LOINC

Scrolling through the list again after entry of the new LOINC code will confirm that it has, indeed, been added to the list of codes to export. When finished reviewing and

adding LOINC Codes to the list of tests to be exported to CDC, exit the screen by typing **Q** at the "Select Action:Q//" prompt.

4.5   Export HL7 Data to CDC (EXP)

Once the LOINC coding has been completed, run the EXP option (Export HL7 Data to CDC). This option loops through the BLS EXPORT LOG file for new entries to export. It creates HL7 messages through the Generic Interface System (GIS), writes them to a host file, and then sends them via File Transfer Protocol (FTP) to the designated computer at IHS Headquarters. This option should be run as soon as LOINC codes have been reviewed and corrected to ensure that the data can be transmitted successfully. When you run the option, the following dialogue would be displayed:

```
Select IHS Loinc Menu Option: EXP Export HL7 Data to CDC
Generating HL7 messages for export

Now writing export file, this could take up to 5 minutes..
Export file BLS20281020020516111408.HL7 in directory  /usr2/cdc created
Sending to IP Address ftp.ihs.gov
File BLS20281020020516111408.HL7 sent to ftp.ihs.gov
```
Figure 4-9: Exporting HL7 data to CDC

Subsequently, this option may be tasked to run every thirty days to extract and export new data. Output from the task will be sent in the BLS EXPORT FILE SENT bulletin. During patch installation, a mail group should be set up to receive this bulletin. Members of the mail group would typically be the site manager and the laboratory supervisor. If the task runs and the file is exported, members of the mail group would receive a bulletin similar to the following:

```
Subj: CDC LOINC Export File Sent  [#297745] 05 Jul 02 18:05  5 Lines
From: POSTMASTER (Sender: ROSEN,DONALD) in 'IN' basket.   Page 1  **NEW**
-----------------------------------------------------------------------

The following CDC LOINC Export file has been sent:

File Name:BLS20210120020705180018.HL7
Directory:/usr13/sentinal/
IP Address:ftp.ihs.gov

Select MESSAGE Action: DELETE (from IN basket)//
```
Figure 4-10: Sample Export Bulletin

4.6   Resend CDC Export File (RSN)

On occasion it may be necessary to resend a file if a server is down or data is to be verified. The RSN option (Resend CDC Export File) is used to view the log of files already created and re-export the desired file. It should be noted that the date the file

was originally exported and sent is in the filename and is bolded in the following example of a file exported and sent on 6/11/2002.

Example: BLS201201***2002061116***0155.HL7

```
Select IHS Loinc Menu Option: RSN  Resend CDC Export File
1 - BLS20210120020523145519.HL7
2 - BLS20210120020605072821.HL7
3 - BLS20210120020606152555.HL7
4 - BLS20210120020611160155.HL7
Resend which file(s) :  (1-4): 4
Sending export file BLS20210120020611160155.HL7 in directory /usr13/sentinal/
Sending to IP Address ftp.ihs.gov
File BLS20210120020611160155.HL7 sent to ftp.ihs.gov
```
Figure 4-11:Resending the CDC Export File

4.7   Cleanup LOINC Export Log/Files (CLN)

The Cleanup LOINC Export Log/Files menu option should be run periodically to eliminate unnecessary disk usage. The cleanup option will purge log entries and files that are older than the specified period in the LOINC DAYS TO KEEP LOG FILE field of the BLR MASTER CONTROL FILE. If this field is blank then it defaults to 30 days. The option is run as follows:

```
Select IHS Loinc Menu Option: CLN  Cleanup LOINC Export Log/Files
Select IHS Loinc Menu Option: CLN  Cleanup LOINC Export Log/Files
Now cleaning up export log file entries older than Jun 06,
2002.................
......................................................................
......................................................................
......................................................................
......................................................................
......................................................................
......................................................................
......................................................................
......................................................................
......................................................................

Now cleaning up host files older than Jun 06, 2002
Removing export file BLS20210120020523145519.HL7 in directory
/usr13/sentinal/
File BLS20210120020523145519.HL7 removed
Removing export file BLS20210120020605072821.HL7 in directory
/usr13/sentinal/
File BLS20210120020605072821.HL7 removed
Removing export file BLS20210120020606152555.HL7 in directory
/usr13/sentinal/
File BLS20210120020606152555.HL7 removed
Now cleaning up export log file entries older than May 15, 2002........
```
Figure 4-12: Cleaning up LOINC Export Log/Files

5.0   Appendix A Glucose Tolerance Test Codes

LOINC Codes for Glucose Tolerance Tests						
Test Name	Challenge	System	Time Interval	Method	Property	LOINC
1 HR OB Screen	50 g glucose	BLOOD	1H	Test Strip	MCNC	No Code
1 HR OB Screen	50 g glucose	SER/PLAS	1H	QN	MCNC	1504-0
Fasting Glucose	CFST	BLOOD	Fast – time unspecified	Test Strip	MCNC	1556-0
Fasting Glucose	CFST	SER/PLAS	Fast – time unspecified	QN	MCNC	1558-6
Fasting Glucose	CFST	URINE	Fast – time unspecified	Test Strip	ORD	6764-5
Glucose 2H PP	Post Meal	BLOOD	2H	QN	MCNC	6689-4
Glucose 2H PP	Post Meal	SER/PLAS	2H	QN	MCNC	1521-4
Fasting GTT	75 g glucose	SER/PLAS	Baseline	QN	MCMC	1552-9
½ HR GTT	75 g glucose	SER/PLAS	30M	QN	MCNC	1527-1
½ hr GTT	75 g glucose	URINE	30M	Test Strip	ACNC	6754-6
1 HR GTT	75 g glucose	SER/PLAS	1H	QN	MCNC	1507-3
1 HR GTT	75 g glucose	URINE	1H	QN	MCNC	1509-9
1 HR GTT	75 g glucose	URINE	1H	Test Strip	ACNC	6748-8
2 HR GTT	75 g glucose	SER/PLAS	2H	QN	MCNC	1518-0
2 HR GTT	75 g glucose	URINE	2H	QN	MCNC	1520-6
2 HR GTT	75 g glucose	URINE	2H	Test Strip	ACNC	6751-2
3 HR GTT	75 g glucose	SER/PLAS	3H	QN	MCNC	1533-9
3 HR GTT	75 g glucose	URINE	3H	Test Strip	ACNC	6755-3
Fasting GTT	100 g glucose	SER/PLAS	Baseline	QN	MCNC	1549-5
½ HR GTT	100 g glucose	SER/PLAS	30M		MCNC	1525-5
½ HR GTT	100 g glucose	URINE	30M	QN	MCNC	1491-0
1 HR GTT	100 g glucose	SER/PLAS	1H	QN	MCNC	1501-6
1 HR GTT	100 g glucose	URINE	1H	QN	MCNC	1503-2
2 HR GTT	100 g glucose	SER/PLAS	2H	QN	MCNC	1514-9
2 HR GTT	100 g glucose	URINE	2H	QN	MCNC	1516-4
3 HR GTT	100 g glucose	SER/PLAS	3H	QN	MCNC	1530-5
3 HR GTT	100 g glucose	URINE	3H	QN	MCNC	1532-1
4 HR GTT	100 g glucose	SER	4H	QN	MCNC	1537-0
4 HR GTT	100 g glucose	URINE	4H	QN	MCNC	1538-8
5 HR GTT	100 g glucose	SER/PLAS	5H	QN	MCNC	1540-4
5 HR GTT	100 g glucose	URINE	5H	QN	MCNC	1541-2

6.0   Contact Information

If you have any questions or comments regarding this distribution, please contact the ITSC Help Desk by:

Phone: (505) 248-4371 or

            (888) 830-7280

Fax: (505) 248-4199

Web: http://www.rpms.ihs.gov/TechSupp.asp

Email: RPMSHelp@mail.ihs.gov